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APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO.
09 944,073	09.04.2001	Taro Osabe	NIT-304	3764

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EXAMINER

TRAN, TAN N

ART UNIT PAPER NUMBER

2826

DATE MAILED: 04/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/944,073

Applicant(s)

OSABE ET AL

Examiner

TAN N TRAN

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on amendment filed on 02/25/03
- 2a) ☒ This action is **FINAL** 2b) ☐ This action is non-final
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al. (US 2002/0109539) in view of Nachumovsky et al. (6,181,597).

With regard to claims 1,2, Takeuchi et al. discloses a non-volatile semiconductor memory device having a memory cell array of aligning plural numbers of memory cells in a matrix like manner, each of the memory cells comprising: a source region 19₁; drain region 19₂; a channel region formed between the source region 19₁ and the drain region 19₂ in the semiconductor substrate 11; a gate electrode 16₁ for controlling potential of the channel region; each of the memory cells having charge storage region formed between the gate electrode and the channel region, and isolated from the gate electrode 16g and the channel region and with each other by an insulator 17, wherein: a first memory cell and a second memory cell neighboring with each other in the direction of channel length share the source region 19₁ in common; and the second semiconductor cell shares the drain region 19₂ in common with a third semiconductor memory cell neighboring therewith;. (Note lines 15-18, paragraph 006, page 1, fig.2A of Takeuchi et al.).

With regard to claims 3,4, Takeuchi et al. discloses a non-volatile semiconductor memory device having a memory cell array of aligning plural numbers of memory cells in a matrix like manner, each of the memory cells comprising: a source region 19₁; drain region 19₂; a channel

region formed between the source region 19_1 and the drain region 19_2 in the semiconductor substrate 11; a gate electrode 16_1 for controlling potential of the channel region; each of the memory cells having charge storage region formed between the gate electrode and the channel region, and isolated from the gate electrode 16_g and the channel region and with each other by an insulator 17 wherein plural numbers of cell separation regions in the memory cell array are aligning in parallel to each other, substantially; plural numbers of word lines for connecting the gate electrodes of the memory cells are aligning in parallel to each other, substantially; the memory cell shares a diffusion layer of the source region 19_1 in common with only one memory cell neighboring in the direction of channel length therewith; source region of at least three of the memory cells neighboring in the direction of channel width are connected with one another through a metal wiring; and the cell separation region is perpendicular to the metal wiring, substantially, and the cell separation region is perpendicular to the word line, substantially. (Note lines 15-18, paragraph 006, and lines 1-6, paragraph 004, page 1, figs.1A,2A,3,8 of Takeuchi et al.).

Takeuchi et al. does not disclose each of the memory cells having plural number of charge storage grains formed between the gate electrode and the channel region.

However, Nachumovsky et al. discloses the memory cell having plural number of charge storage regions (26,28) formed between the gate electrode 24 and the channel region. (Note fig. 2 of Nachumovsky et al.).

Therefore, it would have been obvious to one of ordinary skill in the art to form the Takeuchi et al.'s device having the memory cell having plural number of charge storage regions formed between the gate electrode and the channel region such as taught by Nachumovsky et al.

in order to secure the information stored in the first and second charge trapping regions 26 and 28 is read properly.

Takeuchi et al. and Nachumovsky et al. disclose all the claimed subject matter except for the charge storage regions are the charge storage grains. However, it would have been obvious to one of ordinary skill in the art to form the charge storage regions are the charge storage grains in order to secure the information stored in the first and second charge trapping regions 26 and 28 is read properly.

Response to Arguments

2. Applicant's arguments filed 02/25/03 have been fully considered but they are not persuasive.

It is argued, at page 11 of the remarks, that "Takeuchi et al. do not disclose that each memory cell has plural charge storage regions as in the present invention". However, fig. 2 of Nachumovsky et al. does show the memory cell having plural number of charge storage regions (26,28) formed between the gate electrode 24 and the channel region. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Thus, Applicant's claims 1-4 do not distinguish over Takeuchi et al. and Nachumovsky et al. references.

Conclusion

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Tan Tran whose telephone number is (703) 305-3362. The examiner can normally be reached on M-F 8:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (703) 308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for after final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

TT

Mar 2003

Tan Tran
MPEP 706.07(a)
37 CFR 1.136(a)